

Hemi-Sync Research Professional Journal Publications

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Music and Hemi-Sync in the Treatment of Children with Developmental Disabilities, by Suzanne Evans Morris, Ph.D., *Open Ear*, 1996.

Abstract

The role of music and Hemi-Sync has been explored in the rehabilitation of 20 developmentally disabled children. The children ranged in age from 5 months to 8 years with an average age of 2 years. Within the broad category of developmental disability, the children had received specific diagnoses of cerebral palsy (16), mental retardation (10), autism (5), and uncontrolled seizure disorder (4). The children were referred for therapy because of severe feeding and pre-speech problems. Eighteen of the children were non-verbal and non-ambulatory because of the motor in coordination [sic] of cerebral palsy or an overall delay in development.

The results showed that Hemi-Sync in a musical format could be an effective adjunct to a pre-speech and feeding rehabilitation program. The fifteen children (75% of the group) who made gains in the program had not made similar gains when the program was implemented without the Hemi-Sync background. Significant changes occurred in thirteen of these children within the first two Hemi-Sync sessions. Hemi-Sync contributed to long-term changes in the children's abilities and ways of organizing information.

Accessing Anomalous States of Consciousness with a Binaural Beat Technology, by F. Holmes Atwater, *Journal of Scientific Exploration*, 1997.

Abstract

Exposure to binaural beats in an environment of restricted stimulation coupled with a guidance process can safely provide access to and experiences in many propitious states of consciousness. This method requires a unique combination of well-understood psycho-

physiological inductive techniques with the addition of a refined binaural-beat technology. Binaural beats provide potential consciousness-altering *information* to the brain's reticular activating system. The reticular activating system in turn interprets and reacts to this *information* by stimulating the thalamus and cortex thereby altering arousal states, attentional focus, and the level of awareness, i.e., the elements of consciousness itself. This effective binaural-beat process offers a wide variety of beneficial applications and vehicle for the exploration of expanded states of consciousness.

Inducing States of Consciousness with a Binaural Beat Technology, by F. Holmes Atwater, *Proceedings of the Eighth International Symposium on New Science*, 1997.

Abstract

Altering consciousness to provide a wide range of beneficial effects (stress-reducing relaxation, improved sleep, intuitive, creative, meditative, healing, and expanded-learning states, etc.) necessarily involves either changing levels of arousal or cognitive content or both. The *extended reticular-thalamic activating system* model suggests a neural mechanism responsible for regulating generalized levels of arousal (basic rest-activity cycle, sleep cycles, ultradian rhythms, etc.) as well as behavior- or cognition-specific patterns of arousal. The cortical attributes or contents of consciousness are the result of social-psychological conditioning and elemental cognitive acuity. These ambient factors of consciousness (arousal and content) provide us with a *first-person* experience or awareness. Effective induction of propitious states of consciousness, therefore, requires a multidimensional approach involving sensory-information stimuli, social-psychological conditioning, and education. Binaural beating, a sensory-information stimulus, provides potential consciousness-altering *information* to the reticular-thalamic activating system which in turn alters arousal states, attentional focus, and level of awareness (crucial elements of consciousness itself). Integrated with other sensory-information techniques, social-psychological conditioning tools, and educational curriculum, binaural beats can provide access to a variety of beneficial applications and first-person experiences of expanded states of consciousness.

Auditory Brainwave Stimulation in Treating Alcoholic Depression, by Raymond O. Waldkoetter and Gilbert O. Sanders, *Perceptual and Motor Skills*, 1997.

Abstract

An auditory technology is briefly examined describing brainwave patterns and use associated with lower mean MMPI-2 Depression reported by 9 alcoholics at posttest than 15 controls. An exploratory trial with Native Alaskans/Americans gave positive indication for some consideration as a further alternative treatment.

Inducing Propitious Altered States of Consciousness via Cortico-Thalamic Adaptation, by F. Holmes Atwater, *Consciousness Research Abstracts, Toward a Science of Consciousness, Tucson III*, 1998.

Abstract

States of consciousness form as a synthesis of discrete, yet cortically distributed, levels of arousal combined with specific contents. Functional states tend to maintain a self-generating equilibrium, a homeostasis. Altering consciousness to provide a wide range of beneficial states (stress-reducing relaxation, improved sleep, intuitive, creative, meditative, healing, and expanded-learning states, etc.) necessarily involves either changing levels of arousal or cognitive content or both.

The extended reticular-thalamic activating system (ERTAS) model suggests a neural mechanism responsible for regulating generalized levels of arousal (basic rest-activity cycle, sleep cycles, ultradian rhythms, etc.) as well as individual explicit (behavior- or cognition-specific) patterns of arousal. Neurologically, the specific contents of consciousness are said to be *cortical*. These cortical attributes are the result of social-psychological conditioning and elemental cognitive acuity.

Effective induction of propitious altered states of consciousness via cortico-thalamic adaptation requires a multidimensional approach involving sensory-information stimuli, social-psychological reconditioning, and education. Chief among the sensory-information techniques for inducing beneficial altered states is the procedure of placing an individual into an environment of greatly reduced stimulation for brief periods (less than 2 hours). The two most frequently used methods are lying on a bed in a dark, soundproof room and flotation (dry or wet) in a buoyant liquid at skin temperature in a light-free, soundproof chamber. The *ganzfeld* technique is another effective sensory-information method to induce advantageous altered states of consciousness.

In the ERTAS model, consciousness changes as cortico-thalamic projections adjust to reduced sensory information coming to the midbrain reticular formation and regulate rhythmic EEG patterns throughout the cortex. During this adjustment period, the ERTAS is particularly vulnerable to other stimuli. Sensory information such as aroma, color, music, touch, and binaural beating can all serve to further direct changes in consciousness via cortico-thalamic adaptation. Because consciousness is a synthesis of both arousal and content, altered states of consciousness can be further inspired by changes in a percipient's social-psychological conditioning and cognitive skills. Social-psychological conditioning tools can modify attitude, expectancy, motivation, etc., and educational approaches can expand cognitive skills. Group interaction, counseling, guided visual imagery, affirmation, introspection, reframing, and goal orientation are all safe and effective methods of modifying an individual's social-psychological conditioning and limiting belief systems. Within the ERTAS model, projections between the pre-frontal cortex and the medial dorsal nucleus as well as collateral interaction with the nucleus reticularis allow for a change in social-psychological conditioning to not only directly alter the *content* of consciousness but also alter the *arousal level* associated with such content. Cognitive skills can be enhanced through educational programs such as directed reading, lectures, multimedia presentations, planned group discussions, etc. Equipped with a greater cognitive acumen, individuals are capable of experiencing expanded points of view, i.e., new thoughts, unique ideas, wide-ranging concepts (the *contents* of consciousness). Cortico-thalamic adaptation of these new perspectives results in the experience of propitious states of consciousness.

Binaural Auditory Beats Affect Vigilance Performance and Mood, by James D. Lane, Steffan J. Kasian, Justine E. Owens, and Gail R. Marsh, *Physiology & Behavior*, 1998.

Abstract

When two tones of slightly different frequency are presented separately to the left and right ears the listener perceives a single tone that varies in amplitude at a frequency equal to the frequency difference between the two tones, a perceptual phenomenon known as the binaural auditory beat. Anecdotal reports suggest that binaural auditory beats within the electroencephalograph frequency range can entrain EEG activity and may affect states of consciousness, although few scientific studies have been published. This study compared the effects of binaural auditory beats in the EEG beta and EEG theta/delta frequency ranges on mood and on performance of a vigilance task to investigate their effects on subjective and objective measures of arousal. Participants ($n = 29$) performed a 30-min visual vigilance task on three different days while listening to pink noise containing simple tones or binaural beats either in the beta range (16 and 24 Hz) or the theta/delta range (1.5 and 4 Hz). However, participants were kept blind to the presence of binaural beats to control expectation effects. Presentation of beta-frequency binaural beats yielded more correct target detections and fewer false alarms than presentation of theta/delta frequency binaural beats. In addition, the beta-frequency beats were associated with less negative mood. Results suggest that the presentation of binaural auditory beats can affect psychomotor performance and mood. This technology may have applications for the control of attention and arousal and the enhancement of human performance.

Reports of Peak- and Other Experiences During a Neurotechnology-Based Training Program, Part 1, by Todd Joseph Masluk, *The Journal of the American Society for Psychical Research*, 1998.

Abstract

This two-part study examined the nature of self-reported peak- and other powerful experiences during a 6-day residential, neurotechnology-based training program. There were 160 participants (81 males, 79 females), of whom 121 reported 75 types of peak- and other experiences. *Neurotechnologies* are methods and devices that purportedly enhance mental functioning by entraining brain-wave patterns, often producing a psychophysiological state of hemispheric synchronization. In the present article, which comprises Part 1, research on peak- and other powerful experiences is reviewed. An overview of neurotechnologies is also given.

Reports of Peak- and Other Experiences During a Neurotechnology-Based Training Program, Part 2, by Todd Joseph Masluk, *The Journal of the American Society for Psychical Research*, 1999.

This study examined the nature of self-reported peak- and other powerful experiences during a 6-day residential, neurotechnology-based training program. *Neurotechnologies* are methods and devices that purportedly enhance mental functioning by entraining brain-wave patterns, often producing a psychophysiological state of hemispheric synchronization. A partial review of the literature on these subjects was presented in Part I in the preceding issue of this *Journal*. A two-part peak-experience questionnaire was developed. Part I collected retrospective self-reports of participants' experiences; Part 2, gathered information on their impact and the processes of integration. The Myers-Briggs Type Indicator measured participants' personality characteristics; the Herrmann Brain Dominance Instrument measured cognitive styles. Of 160 participants (81 males, 79 females), 121 reported 75 types of peak and other experiences. These were grouped by phenomenological content under four categories: "intensified sensory and perceptual," "cognitive," "psychodynamic," and "transpersonal." Types, intensity, and richness of patterns of experience reported were strikingly similar to those reported by psychedelic (LSD) researchers. Short-term aftereffects occurred in four areas: ontological, spiritual, psychological, and bioenergetical. Longer-term aftereffects resembled changes associated with the sustained practice of meditation. Most experiences had a moderate to "life-changing" impact. Peak-experiences, narrowly defined, had the greatest reported impact overall. Chi-square analyses yielded nonsignificant differences between peak-experiencers ($n = 16$) and non-experiencers ($n = 20$) on personality type, cognitive style, religious affiliation, educational level, age, and gender. However, differences approached significance on religious orientation ($X^2 = 2.043$, $p = .15288$), which may indicate a trend worthy of further investigation with a larger sample. Mental engagement with experiences was important in integrating and being changed by them. This was evidenced by the positive relationship between amount of time spent thinking about one's experiences and their degree of impact ($r = .4849$, $p < .001$). The most preferred method of integration involved discussing one's experiences, followed by reading about similar experiences, keeping one's experiences to oneself, and writing about one's experiences. Factors hindering the integrative process are discussed. Results contribute to understanding the varieties of exceptional human experience.

Exploring Consciousness with the Hemi-Sync Process, by F. Holmes Atwater, *Proceedings of the 1st International Forum on Consciousness Research & 2nd International Congress of Projectiology*, 1999.

Abstract

Altering consciousness to provide a wide range of beneficial effects (stress-reducing relaxation, improved sleep, intuitive, creative, meditative, healing, and expanded-learning states, out-of-body experiences, etc.) necessarily involves either changing levels of arousal or cognitive content or both. Although we are not in the ultimate sense composed of our physical bodies or our brains, the *extended reticular-thalamic activating system* model suggests a neural mechanism responsible for regulating generalized levels of arousal (basic rest-activity cycle, sleep cycles, ultradian rhythms, etc.) as well as behavior- or cognition-

specific patterns of arousal. From a brain/body perspective the cortical attributes or contents of consciousness are the result of social-psychological conditioning and elemental cognitive acuity. These ambient factors of physical consciousness (arousal and content) provide us with a *first-person* experience or awareness. Effective induction of propitious states of consciousness, therefore, requires a multidimensional approach involving sensory-information stimuli, social-psychological conditioning, and education. Hemi-Sync, a sensory-information stimulus, provides potential consciousness-altering *information* to the reticular-thalamic activating system, which in turn alters arousal states, attentional focus, and level of awareness (crucial elements of consciousness itself). Integrated with other sensory-information techniques, social-psychological conditioning tools, and educational curriculum, Hemi-Sync can provide access to a variety of beneficial applications and first-person experiences of expanded states of consciousness including the out-of-body state and the realization that consciousness survives the process of physical death.

Hemispheric-synchronization during anesthesia: a double-blind randomised trial using audiotapes for intra-operative nociception control, by P. Kliempt, D. Ruta, S. Ogston, A. Landeck and K. Martay, *Anesthesia*, 1999.

Abstract

The possible antinociceptive effect of hemispheric-synchronised sounds, classical music and blank tape were investigated in patients undergoing surgery under general anesthesia. The study was performed on 76 patients, ASA 1 or 2, aged 18-75 years using a double-blind randomised design. Each of the three tapes was allocated to the patients according to a computer-generated random number table. General anesthesia was standardized and consisted of propofol, nitrous oxide 66%/ oxygen 33%, isoflurane and fentanyl. Patients breathed spontaneously through a laryngeal mask and the end-tidal isoflurane concentration was maintained near to its minimum alveolar concentration value of 1.2%. Fentanyl was given intravenously sufficient to keep the intra-operative heart rate and arterial blood pressure within 20% of pre-operative baseline values and the fentanyl requirements were used as a measure of nociception control. Patients to whom hemispheric-synchronized sounds were played under general anesthesia required significantly less fentanyl compared with patients listening to classical music or blank tape (mean values: 28 µg, 124 µg and 126 µg, respectively) ($p < 0.001$). This difference remained significant when regression analysis was used to control for the effects of age and sex.

Cortico-Thalamic Adaptation of Binaural Beating, by F. Holmes Atwater, *Consciousness Research Abstracts, Toward a Science of Consciousness, Tucson 2000*, 2000.

Abstract

Neurology suggests that the reticular formation's adjustment of acetylcholine levels governs cortical-arousal states. It may be possible to regulate this brainstem-reticular activity and corresponding cortical-arousal states voluntarily through the introduction of rhythmic sound, particularly binaural beating. When binaural beating emerges within the

olivary nuclei as a coherent oscillation (objectively evidenced cortically by an EEG frequency-following response), this internal oscillation (*frequency information*) concurrently resonates within the brainstem's reticular formation. Hypothetically, cholinergic neurons within the nucleus reticularis adapt to this unique frequency information. In doing so they alter (or act to maintain) the ongoing transport and production of acetylcholine to the cortex, which consequently changes or stabilizes cortical levels of arousal.

In support of this theoretical perspective, the study presented examined the degree to which complex binaural beats influenced cortical levels of arousal as measured by dominant brainwave activity (in this case, central delta and occipital alpha). It was hypothesized that listening to binaural beats for several minutes would modify ongoing brainwave activity. It was also postulated, that by increasing the amplitude of delta-frequency stimulus while decreasing the amplitude of alpha-frequency stimulus during the experiment, subjects would exhibit comparable changes in arousal as measured by EEG.

The results of this study significantly ($P < .001$) distinguished EEG activity during the stimulus periods from the baseline EEG recordings, with both increased central-delta activity and decreased occipital-alpha activity. Decreases in alpha amplitudes coupled with increasing delta activity indicated reduced cortical arousal. The mounting changes over the course of the stimuli suggested a deepening trend of progressive relaxation.

A basic question raised by this study was the role of binaural-beat stimulation as the sole or direct cause of the observed changes. It may be that the subjects in this study were naturally adept at altering levels of arousal or influenced by expectation. A placebo replication of this study examined the degree to which similar tones that did not produce the sensation of binaural beating influenced cortical levels of arousal as measured by EEG.

The results of this placebo experiment showed no significant changes in EEG activity during the stimulus periods when compared to the baseline EEG recordings. That finding tends to support the results of the original experiment: listening to binaural beats for several minutes modifies ongoing brainwave activity and collateral states of arousal.

Such a direct effect necessarily involves the interaction of the binaural-beat stimuli with the basic rest-activity cycle, other sensory stimulation, and with "higher order" memory or attentional processes modulated by the reticular formation. Natural state changing mechanisms, ultradian rhythms, individual differences, prior experience, and beliefs may all contribute to the effects of and response to binaural-beat stimulation as they do with most other behaviors.

The practical application of binaural beats in the voluntary regulation of cortical-arousal levels has implications for the enhancement of human performance. Binaural beats could be used to control generalized arousal levels, e.g., the basic rest/activity cycle, sleep cycles, mood and motivational states, orienting, and vigilance.

Binaural-Beat Induced Theta EEG Activity and Hypnotic Susceptibility, by Brian Brady and Larry Stevens, *American Journal of Clinical Hypnosis*, 2000.

Abstract

Six participants varying in degree of hypnotizability (two lows, two mediums, and two highs) were exposed to three 20-minute sessions of a binaural-beat sound stimulation protocol designed to enhance theta brainwave activity. The Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C) was used for pre- and post-stimulus measures of hypnotic susceptibility. A time-series analysis was utilized to evaluate anterior theta activity in response to binaural-beat sound stimulation over baseline and stimulus sessions. The protocol designed to increase anterior theta activity resulted in a significant increase in percent theta for five of six participants. Hypnotic susceptibility levels remained stable in the high-susceptible group and increased significantly in the low- and medium-susceptible groups.

USE OF BINAURAL BEAT TAPES FOR TREATMENT OF ANXIETY: A PILOT STUDY OF TAPE PREFERENCE AND OUTCOMES, by Reni-Pierre Le Scouamec, PhD, Roger-Michel Poirier, MD, Justine E. Owens, PhD, Jules Gauthier, MD, Ann Gill Taylor, RN, MS, EdD, and Pamela A. Foresman, BA, *Alternative Therapies*, 2001.

Abstract

Recent studies and anecdotal reports suggest that binaural auditory beats can affect mood, performance on vigilance tasks, and anxiety. To determine whether mildly anxious people would, report decreased anxiety after listening daily for one month to tapes imbedded with tones that create binaural beats, and whether they would show a definite tape preference among three tapes, a volunteer sample of 15 mildly anxious patients were seen in the Clinique Psyche, Montreal, Quebec.

Participants were asked to listen at least five times weekly for four weeks to one or more of three music tapes containing tones that produce binaural beats in the electroencephalogram delta/theta frequency range. Participants also were asked to record tape usage, tape preference, and anxiety ratings in a journal before and after listening to the tape or tapes. Anxiety ratings before and after tape listening, pre- and post- study State-Trait Anxiety Inventory scores, and tape preferences were documented in daily journals.

Listening to the binaural beat tapes resulted in a significant reduction in the anxiety score reported daily in patient's diaries. The number of times participants listened to the tapes in four weeks ranged from 10 to 17 (an average of 1.4 to 2.4 times per week) for approximately 30 minutes per session. End-of-study tape preferences indicated that slightly more participants preferred tape B, with its pronounced and extended patterns of binaural beats, over tapes A and C. Changes in pre- and post-test listening State-Trait Anxiety Inventory scores trended toward a reduction of anxiety, but these differences were not statistically significant.

Listening to binaural beat tapes in the delta/theta electroencephalogram range may be beneficial in reducing mild anxiety. Future studies should account for music preference among participants and include age as a factor in outcomes, incentives to foster tape

listening, and a physiologic measure of anxiety reduction. A controlled trial that includes binaural beat tapes as an adjunctive treatment to conventional therapy for mild anxiety may be warranted.

Hemi-Sync Research University Studies

Metamusic with Hemi-Sync as an Adjunct to Intervention with Developmentally Delayed Young Children, by Karen Varney, Virginia Commonwealth University, 1988.

Abstract

The purpose of this study was twofold: (1) to determine if there was significant improvement in the focus of attention and muscle coordination of six developmentally delayed young children when they listened to Metamusic tapes with Hemi-Sync and Metamusic EDU without Hemi-Sync during intervention. Focus of attention and muscle coordination was measured by an increase in one or more of the following behaviors: imitation of gestures, facial expressions, two-word phrases, spontaneous use of two-word phrases, and purposeful reaching and purposeful releasing of objects; (2) to determine if there was a difference in improvement between the three children who listened to Metamusic with Hemi-Sync and the three children who listened to Metamusic EDU tapes without Hemi-Sync.

A modified single subject comparison design was used in this study. The sample included six male children between the ages of 15 and 29 months who were enrolled in a home-based early intervention program. Diagnoses included Down Syndrome (1), neurological disorder (2), and developmental delay (3). The study was conducted during weekly one-hour intervention sessions in five of the Children's homes and in a daycare center for one child. Both baseline and intervention lasted for four to five weeks.

Data in this study indicated five of the six children in the study demonstrated improvements during intervention and the three children who listened to Metamusic with Hemi-Sync during intervention demonstrated greater improvements than the children who listened to Metamusic EDU tapes.

It was concluded that playing Metamusic with Hemi-Sync during intervention appeared to improve imitation of gestures, facial expressions, two-word phrases, and spontaneous use of two-word phrases. Metamusic with Hemi-Sync also appeared to increase attention behaviors and child-initiated interactions.

Although the usefulness and effectiveness of Metamusic with Hemi-Sync requires additional empirical evidence, this study demonstrates its potential as an adjunct to intervention with developmentally delayed young children.

EEG and Subjective Correlates of Alpha-Frequency Binaural-Beat Stimulation Combined with Alpha Biofeedback, by Dale S. Foster, Memphis State University, 1990.

Abstract

The purpose of this study was to determine the effects of alpha-frequency binaural-beat stimulation combined with alpha biofeedback on alpha-frequency brain-wave production and subjective experience of mental and physical relaxation. The study compared the alpha brain-wave production and subjective report of mental and physical relaxation of four groups, each of which received brief relaxation response training and one of four treatments: 1) alpha-frequency binaural-beat stimulation, 2) visual alpha-frequency brain-wave biofeedback, 3) alpha-frequency binaural-beat stimulation combined with visual alpha biofeedback, or 4) artificially produced ocean surf sounds. Sixty volunteer undergraduate and graduate students were randomly assigned to the four groups and instructed to utilize their respective treatment as the "mental device" in Benson's relaxation response paradigm while they relaxed with eyes open for twenty minutes.

Two 2 X 4 mixed ANOVAs revealed that all-groups evidenced increased subjective report of relaxation and increased alpha production. An interaction effect was found in which the group with both alpha binaural beats and alpha biofeedback produced more treatment alpha than the group with alpha biofeedback alone. Additionally, nine of the fifteen subjects with both binaural beats and feedback reported being able to control alpha production via their focus on the alpha binaural beats. The data suggest the possibility that binaural beats can be used to evoke specific cortical potentials through a frequency-following response. Further investigation is warranted into the possibilities of using binaural beats alone and in conjunction with brain-wave biofeedback to promote the self-regulation and management of consciousness.

An Empirical Investigation Into the Effect of Beta Frequency Binaural-beat Audio Signals on Four Measures of Human Memory, by Richard Cauley Kennerly, West Georgia College, 1994.

Abstract

Beta frequency binaural-beat audio signals were utilized to investigate facilitation of human performance on two memory tasks and two memory-related tasks. Subjects were 50 college students randomly assigned with a double-blind methodology to the control or experimental groups. The control group listened to instrumental music. The experimental group listened to the same music with binaural-beat audio signals bedded under the music. The four dependent variables used were a 25-item word list recall test, a 25-item word list recall/recognition test, and from the WAIS-R the digit symbol and digit span subtests. The experimental group displayed statistically significant ($p > .05$) increases in mean scores with the word list recall test, the digit symbol subtest, and the digit span subtest. No statistically significant increases in the experimental mean over the control mean were noted in the word list recognition/recall subtest. The results indicate that beta frequency binaural-beat audio signals are an effective method for facilitating simple free recall memory, ability to attend, and the ability to persevere at routine motor tasks.

Binaural-Beat Induced Theta EEG Activity and Hypnotic Susceptibility, by D. Brian Brady, Northern Arizona University, 1997.

Abstract

Six participants varying in degree of hypnotizability (two lows, two mediums, and two highs) were exposed to three sessions of a binaural-beat sound stimulation protocol designed to enhance theta brainwave activity. The Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C) was used for pre- and post-stimulus measures of hypnotic susceptibility. Time-series analysis was utilized to evaluate anterior theta activity in response to binaural-beat sound stimulation over baseline and stimulus sessions. The protocol designed to increase anterior theta activity resulted in a significant increase theta measures (% activity) between pre-stimulus baseline and stimulus observations for five of six participants. Hypnotic susceptibility levels remained stable in the high-susceptible group and increased significantly in the low- and medium-susceptible groups.

Hemi-Sync Research Unpublished Independent Investigations

Tests of the Sleep Induction Technique, Arthur Hastings, Ph.D., 1975.

Abstract

The major question we investigated was simply: How well does it work? To find out, we conducted tests on 25 people, using a cassette sleep-induction tape supplied by Mr. Monroe. The tape was 45 minutes long, and contained a sequence of the electronically generated sounds, designed to take a person through relaxation to sleep, and then back to wakefulness at the conclusion. These sounds were masked by a sound like ocean surf, thus were only heard very faintly, behind the masking sound.

The tape was played through a cassette deck or recorder, and listened to on stereo headphones, usually in a darkened room with the eyes closed. Each listener then completed a questionnaire and was interviewed. The questionnaire asked if the person fell asleep, what the depth and quality of the sleep were, how he felt when he woke up, and other questions.

The conclusion we reached from these tests was that the sleep tape does work—it induced sleep for a substantial percentage of the people who listen to it. The sleep was relaxing, and people woke up feeling refreshed and wide-awake. Some did not fall asleep, but they still reported that the tape induced relaxation and calmness, and that they felt more wakeful after the end of the tape.

Effects of Audio Signals on Brainwaves, by Bill D. Schul, Ph.D., 1981.

Abstract

During the grant period for the project, November 1, 1980, to November 1, 1981, a total of eighty-four experimental subjects were tested as to the effects of audio signals on brainwave frequency and amplitude. However, twenty of these numbers were used for testing of instruments and procedural determinations. Sixty-four experimental subjects were tested once or on several occasions, depending on the nature of the experiments. In addition, eight experimental subjects were tested during verbal communication with a healer and during diagnosis and treatment by the healer.

In reviewing the experimental work of the project for the grant period, the results revealed that audio sounds and signals do affect brainwave performance. It can be assumed that sitting comfortably in a lounge in subdued light and with nothing to do will promote relaxation, i.e., lower brainwave frequency and raise amplitude in the lower frequency ranges. However, the experiments demonstrated that certain audio signals produced binaurally, regularly enlisted a deeper state of relaxation than self-induced relaxation, pleasant-experience recall, or other audio sounds, including different kinds of music. These most effective signals were a combination of different signals directed to the left ear than

to the right, thus establishing a beat resonance in the alpha-theta ranges and a frequency-following response resulted. The entrainment to these signals became predictable.

The Effects Upon Adolescence Behavioral Outburst As A Function Of The Administration Of Audio Tapes Containing Sub-audible Sound Frequencies (Binaural Beats Technique), by James M. Thomas, Jr., Ph.D., 1988.

Abstract

Children who were clinically diagnosed as "Seriously Emotionally Disturbed" were administered successive regular trials of auditory relaxation tapes with a sub-audible combination of sound frequencies. The research tapes were recorded using the binaural evocation technique of Hemispheric Synchronization (Hemi-Sync) by way of stereo headset. The children listened to the tape three times a week and incident reports regarding behavioral outbursts were recorded eight weeks prior to and eight weeks during the time the tapes were being administered. Results suggested that there were significantly fewer incident reports during the time the tapes were being administered.

Enhancing Learning Environments (Research), by James Akenhead

Independent research by the Superintendent of Schools, Marlinton School District, Alliance, Ohio

Background

As a career educator and consultant for more than thirty years, I'm continually interested in methods to enhance instruction in professional workshops, seminars and presentations. After facilitating several hundred workshops, anything that helps tired and sometimes burned out people to get more out of the presentations is considered. Ways of improving content presentation, adding humor, and varying instructional techniques and processes all receive attention. Last summer I experimented with yet another dimension to aid workshop participants in getting the most for their time and effort. This project involved the use of Hemi-Sync for enhancing the delivery of a workshop on conflict management.

Hemi-Sync® Into Creativity, by Chok C. Hiew, Ph.D.

Independent research conducted at the University of New Brunswick

Abstract

This paper reports a pilot study designed to test the impact of Hemi-Sync® audiotapes on creative responses and divergent thinking. Two Hemi-Sync® tapes were used. In Session I, the Deep 10 Relaxation tape was used to induce a deep state of physical and mental relaxation. In Session II, after repeating the Deep 10 tape for the first 6.5 minutes, subjects

spent the remainder of the session listening to the Surf tape. Surf consists of the sounds of ocean waves and Hemi-Sync® with no verbal instructions. It was predicted that after listening to this Hemi-Sync® tape in Session II, subjects would show the best performance when evaluated for creativity.

The Hemi-Sync® Phenomenon: In Search of Empirical Theories, by M. R. Sadigh, Ph.D.

Independent research conducted by The Gateway Institute, Bethlehem, Pennsylvania

Abstract

Three years ago, with much "healthy" scientific doubt I began studying the effects of Hemi-Sync on electrocortical activity of human subjects. Study after study, I have been impressed by the effectiveness and the versatility of this audio technology to guide and entrain the brain to enter a variety of states of consciousness. These days, brain entrainment modalities are in vogue. Unfortunately, however, in my view, entrepreneurs and business people selling these gadgets and tapes seem to benefit more from them than the consumer. Therefore, it is quite refreshing to know that there is a brain-entrainment modality that actually works. In fact, I am convinced that Hemi-Sync goes beyond "blind" entrainment and consequently avoids some of the danger of underdeveloped technologies that clearly have the potential to do harm to those using them.

The Effects of Hemi-Sync® on Electrocortical Activity: A Review of Three Empirical Studies, by M. R. Sadigh, Ph.D.

Independent research conducted by The Gateway Institute, Bethlehem, Pennsylvania

We wish to dedicate this paper to Robert A. Monroe: a man whose love and compassion for humanity have forever changed and expanded the definition of human consciousness.

Introduction

Bilateral hemispheric synchronization is a phenomenon which has been attracting the attention of researchers and clinicians for sometime. It has been approximately thirty years since a number of studies showed that adept meditators tended to bring about a state of phasic hemispheric synchrony while in deep meditation (see Carrington, 1977). In a classic and often cited study, Banquet (1973) demonstrated that advanced TM meditators could indeed achieve total brain synchrony after minutes of repeating a mantra. However, even in adept meditators the dominant brain-wave frequency in which the state of synchrony takes place is almost impossible to predict and/or control.

Banquet (1973) suggested that during meditation a greater equalization of the functioning of the hemispheres tends to take place. This relative shift in hemispheric dominance (from left-brain dominance to whole-brain dominance) may result in therapeutic effects which are likely to enhance mind-body integration and overall improvements in physical and emotional health. Because of a reduction in cognitive activities during moments of whole brain synchrony, it is believed that negative thinking, self-punitive thoughts and excessive worrying are apt to slow down and consequently a reduction in cognitive anxiety is experienced (Carrington, 1977; Sadigh, 1991; Schwartz, Davidson, & Goleman, 1978).

Delmonte (1984) suggested that creative intelligence requires the synthesis and collaboration of both the analytic and the spatial/intuitive halves of the brain. Again, it appears that this left-brain-right-brain synthesis can be achieved almost at will by adept meditators, especially those who practice TM.

Green and Green (1989) believed that long term biofeedback and relaxation training resulted in a harmonious relationship between the two hemispheres which facilitated control of the autonomic nervous system. This control can especially be helpful in the treatment of a variety of stress related and psychosomatic disorders. The authors also suggested that such states of bilateral synchrony may indeed bring about positive changes in psychophysical health as well as therapeutic alterations in underlying personality characteristics which may interfere with healthy growth and development.

Ornstein and Thompson (1984) criticized the Western emphasis on intelligence in terms of written or spoken word. They believed that perhaps the reason we have difficulties expanding our standards of education is because of this overemphasis on the potentials and abilities of the analytic/verbal brain. Studies investigating whole-brain synthesis clearly suggest that human knowledge, intelligence, and well being may very well be achieved as the two brains begin to function as one--in unison and in synchrony. Table 1 summarizes some of the documented characteristics of the two hemispheres.

The Facilitation of Attention Utilizing Therapeutic Sounds, by George Guilfoyle, Ph.D., and Dominic Carbone, Ph.D.

Independent research presented at the New York State Association of Day Service Providers Symposium, October 18, 1996, Albany, New York

Background

George Guilfoyle is a licensed psychologist in the state of New York. He has spent the bulk of his career working with the emotionally and physically challenged. He is presently a senior psychologist on the staff of the Young Adult Institute, Manhattan Day Treatment Program, which serves mentally retarded/developmentally disabled adults in New York City. Dr. Guilfoyle has been a Professional Member of The Monroe Institute since June, 1996. Co-investigator Dominic Carbone is psychology unit head at the Young Adult

Institute. This article was adapted from a paper presented at the New York State Association of Day Service Providers Symposium, October 18, 1996, Albany, New York.

Hemi-Sync Research Bob Monroe Research Lab (In-house Reports)

The Hemi-Sync Process, by F. Holmes Atwater, 1999. (being updated 2004)

Abstract

Robert Monroe developed and patented a binaural-beat technology called the Hemi-Sync auditory-guidance system. The Monroe Institute, a 501c(3) nonprofit research and educational organization, uses this Hemi-Sync system within an educational *process*. During this process individuals listen to a combination of multiplexed audio binaural beats that are mixed with music, pink sound, and/or the natural sound of surf. Binaural-beat stimulation, coupled with the effects of the other components within the Hemi-Sync process, encourages access to focused states of consciousness.

Ancient cultures used the natural power of sound and music to safely influence states of consciousness in religious ceremonies and to promote psychological and physical health. Today, the idea that auditory stimulation can affect consciousness is widely accepted (Poole 1993). Hemi-Sync represents the state-of-the art in the technological application of the natural power of sound and it has a variety of beneficial applications. Studies have shown improvements in sensory integration (Morris 1990), relaxation, meditation, stress reduction, pain management, sleep (Wilson 1990; Rhodes 1993), and health care (Carter 1993). Hemi-Sync has proven effective in producing enriched learning environments, enhanced memory (Kennerly 1994), improved creativity (Hiew 1995), increased intuition, improved reliability in remote viewing (McMoneagle 1993), telepathy, and out-of-body experience. Understanding of the effectiveness of Hemi-Sync goes beyond knowing about the natural power of sound to include the well-known autonomic effects of restricted environmental stimulation, controlled breathing, progressive relaxation, and the psychology of affirmations and visualizations. This paper discusses the brain-mind model, brain waves and their relationship to states of consciousness and the role of the reticular activating system (RAS) in regulating brain waves, and beneficial social-psychological conditioning and educational processes.

Binaural Beats and the Frequency Following Response, by F. Holmes Atwater, 2000.

Abstract

Persistent rhythmic auditory stimuli neurologically manifest as a cortical frequency-following response (Oster 1973; Smith et al. 1975; Marsh et al. 1975; Smith et al. 1978; Hink et al. 1980). Both Oster (1973) and Hink et al. (1980) have demonstrated a frequency-following response (FFR) to binaural beating with an *evoked-potential* EEG protocol in the context of hearing-acuity research.

This study was designed to further the above-cited previous FFR work with respect to binaural beating using multiple-subject trials (N = 7) and an appropriate *evoked-potential*

protocol. Results showed subjects exposed to specific binaural-beat stimuli evidenced increases in amplitude of time-domain averaged EEG in frequencies matching the binaural-beat stimuli when compared to the silence-baseline condition. Elevation in EEG amplitudes in comparison to the silence-baseline condition was also seen in reaction to alternative stimuli.

Statistical analysis revealed non-significant increases in 16 Hz time-domain averaged EEG amplitudes during the 16 Hz binaural-beat stimulus periods over the silence-baseline condition when the increases in EEG during the alternative stimuli were considered. There was, therefore, no evidence of a 16 Hz FFR. Significant ($p \leq 0.05$) increases in 7 Hz EEG amplitudes were, however, demonstrated during the 7 Hz stimulus condition, which provided evidence of a 7 Hz FFR during the 7 Hz binaural-beat stimulus periods even when the increases in EEG during the alternative stimuli were considered.

Binaural Beats and the Regulation of Arousal Levels, by F. Holmes Atwater, 2000.

Abstract

This paper describes two studies. A first study measured the neural accommodation (changes in ongoing or overall brainwave activity) associated with complex binaural-beat stimuli. A second study, based on the same protocol, measured changes in ongoing brainwave activity associated with placebo stimuli.

A weak EEG frequency-following response to binaural beating and other rhythmic stimuli manifests using time-domain averaging brainwave analysis techniques. Theoretically, this frequency-following response emerges as a low-amplitude linked series of evoked-potential responses. It is important to note that these studies examined ongoing brainwave activity (in this case, central delta and occipital alpha) and not the frequency-following response.

Results of the two studies showed that during the binaural beat stimuli, reductions in the percentages of occipital alpha (bipolar O1-O2) were significant (individually, $p < .05$ and together, $p < .001$) during five of six free-running EEG recording periods compared to baselines. During these same recording periods reductions in the percentages of central delta (bipolar C3-C4) were similarly significant during four of six periods compared to baselines. Alpha- and delta-brainwave changes were non-significant during the placebo stimuli.

The extended reticular-thalamic activating system (ERTAS) may be the neural mechanism behind the observed brainwave changes. The reticular formation of the brain stimulating the thalamus and cortex (referred to as the ERTAS) governs cortical brainwave patterns. Acetylcholine, provided via cortico-thalamic projections, either inhibits or excites areas of the cortex by neutralizing or enhancing the effects of noradrenaline and serotonin coming to the cortex via “fountains” from the locus coeruleus and the raphe nuclei.

Healing/Regeneration Center Exploration, A Preliminary Report, by F. Holmes Atwater, 2001.

Abstract

Since the fall of 1998, The Bob Monroe Research Lab has been studying descriptions and experiences of a subjective realm identified as the “Healing/Regeneration Center.” Participants in the Beyond Exploration 27 residential program have provided the material being studied.

With this research, we seek an understanding of phenomena and subjective experiences, congruent with the Bob Monroe Research Lab’s traditional intent—the continuing development of methods and techniques that will promote the evolution and growth of human consciousness. Our findings will enable us to enhance the Institute’s educational curriculum and inspire a greater understanding and cultural acceptance of humankind’s true spiritual nature.

There are several qualitative consistencies within the data that seem to indicate that the information analyzed thus far provides meaningful insights into the nonphysical realm. Although there is still a great deal of material to analyze, we appear to be on the right course for contributing to a greater understanding and cultural acceptance of humankind’s true spiritual nature.

Healing/Regeneration Center Exploration, by F. Holmes Atwater, August 2001.

Abstract

In keeping with the continuing development of methods and techniques promoting the evolution of human consciousness, this qualitative study of the Healing/Regeneration Center, a venue purportedly experienced following death, examined the subjective reports of eighty-nine volunteer participants.

The research methodology applied an interpretive approach based on hermeneutics and phenomenology, combining case studies and ethnographic data. Participant applications and in-program questionnaires were analyzed with three different techniques: hermeneutics (word meaning), semiotics (symbol interpretation), and the narrative and metaphor (story analysis) method using computer-analysis software, QSR Nvivo® Version 1.2.142 for a Pentium®-class personal computer.

Results of this study indicate that the nonphysical healing/regeneration process involves the presence of spiritual beings, the experiences of love, energy and light, and happiness or enjoyment. The key to maintaining optimal health is to express love. In the boundary area just beyond human experience, there exists a realm of creation. Individual personal differences, referred to as attributes, did not significantly contribute to the results obtained.

There are several qualitative consistencies within the data that seem to indicate that the information analyzed provides meaningful insights into a nonphysical, spiritual realm. The

participants' descriptive similarities of the realm labeled the Healing/Regeneration Center imply a shared view of the afterlife—or, in Jungian terminology, a collective unconscious phenomenon.

Hemi-Sync Research Breakthrough & Hemi-Sync Journal Articles

Date	Name of Article	Author
3/83	Autism Helped by Hemi-Sync Experience with Surgical Tapes Hemi-Sync and Vision Improvement HP-10 Is Effective	Kathryn Bright David Edgar Jean Gold editor
8/83	Effects of Music and Hemi-Sync on a Child with a Seizure Disorder Personal Testimonial on the Emergency Treatment Series Short Stories - elderly	Suzanne Morris Gari Carter Laura Wulfhorst
9/83	Why Gateway Report of Classroom Demonstration of Hemi-Sync Has Your Lake Risen Up to Heaven? How Does HP-10 Affect You? Informal Workshop Hypermnesia Experiment – education	James Jones Terry Kramer Melissa Jager editor John Majuri Devon Edrington
12/83	First Annual Professional Seminar Increasing Organizational Effectiveness with the Aid of Hemi-Sync Hemi-Sync with Alcohol Abuse Patients Focusing Attention on Hemi-Sync - education	editor James Jones Paul/Marion Travis Devon Edrington
12/84	Second Annual Professional Seminar Integration of Yoga and Hemi-Sync	editor Richard Carstens
3/85	Hemi-Sync Synthesizer - in schools Achieving Optimal Learning States - in schools The Benefits of Hemi-Sync - in schools Use of the Synthesizer - in schools Interesting Side Effects of Hemi-Sync Metamusic A compelling Experience - medicine The Effects of Hemi-Sync with Hypnosis and Magnetic Healing	editor Suzanne Morris Ed Levy Harald Wessbecher
6/85	Applications of Monroe Hemi-Sync Tapes to Treatment of Behavioral Disordered Retarded Clients Professional Report - Reiki healing Third Annual Professional Seminar (upcoming)	Ron Brill John Harvey Gray editor

9/85	Hemi-Sync and the Art of Moving Teeth Anecdotal Report - cancer patient A First Hand Account on HP-10 - over eating	Barbara Bowen Fowler Jones John Reed
12/85	Music and Hemi-Sync in the Treatment of Children with Developmental Disabilities (single report available) Effect of Rest and Hemi-Sync Compared to Effects of Rest and Guided Imagery on the Enhancement of Creativity in Problem-Solving - <u>(incl. flotation)</u> (single report available)	Suzanne Morris Deborah Baker
3/86	Hemi-Sync in the Classroom Use of TMI Tapes by Hospice of Chattanooga - terminally ill	Jo Dee Owens Ruth Domin
6/86	Hemi-Sync and Surgery: - Results of Emergency Treatment Tapes Used in Splenectomy - Results of Emergency Treatment Tapes Used in Back Surgery Discovery the Shadow - pain/stress reduction Fourth Annual Professional Seminar (upcoming)	Nicola Gilbert Bob Roalfe Bob Tollaksen editor
9/86	Fourth Annual Professional Seminar Reports: . Music and Hemi-Sync: Impact on Learning . Introducing Hemi-Sync to Health Care Practitioners . Remote Viewing: The "TERM" Method of Growth . Channelling Medical Information: Interface Between Two Dimensions . Making the Connection: Business-Consciousness . Biofeedback: What & Why . Integration of Hemi-Sync into a Diversified Health Clinic . Practical Applications of Hemi-Sync in Regressive Therapy . High Tech Vision Quest: Similarities of Gateway Programs of Native Americans and TMI Gateway Programs . Progress in the Explorer Program	Suzanne Morris Ron Brill Joe McMoneagle Al Dahlberg/Winter James Jones Karen Malik Ed Lasko Dan Clausing Ann Martin Rita & Martin Warren
12/86	Hemi-Sync and Auto Racing Patients Reactions to Hemi-Sync	Michael Keen Ed Levy
3/87	Metamusic - special edition - education	Suzanne Morris

6/87	Hemi-Sync and Remedial Therapy - medicine/therapy Brain Hemisphere Synchronization and Musical Learning - education	Jill Russell Greg Carroll
Fall 1987	Fifth Annual Professional Seminar Reports . Human Plus . Intuitive Diagnosis . Death & Transformation . The Use of Hemi-Sync to Facilitate Change In Organizations . Birth Death and The Magic In Between . Letting Go To Spark Creativity . Use of Hemi-Sync with Surgical Patients Seminar Project Groups: . Healing Tapes . Tapes For Children . Life Transitions . Creating Customized Hemi-Sync Tapes & Other Applications for Hemi-Sync Synthesizer . New Medicine/Group Mind . Physiologically Controlled Hemi-Sync System	Robert A. Monroe/ F. Holmes Atwater Winter Robinson Elisabeth Kubler- Ross Richard Gilson/ Susan Kuznik Robert Medralla Chic Thompson Bob Roalfe Group Leader: Suzanne Jonas Suzanne Morris Ruth Domin Kristen Eichleay Teena Anderson F. Holmes Atwater
WINTER 1988	Some Observations on the Efficacy of The Hemi-Sync Synthesizer . The Mind Mirror . The Graham Potentializer . The Tranquilite . Hypno Peripheral Processing . Neuroelectric Devices Hemi-Sync and Hospice: A Natural Partnership . Purpose . Procedure . What We Have Learned . Other Uses . Recommendations . Three Case Histories	Michael Hutchison Ruth Domin
SPRING 1988	Hemi-Sync in the Delivery Suite Creative Writing and Hemi-Sync . The Method	Sheila Bick Trevor Magilton

	.Reactions Progress Report: Alternative Mental Processes For Enhanced Creativity .In-House Group Leaders/Lead Scientists .Results	Jerry Krochmal/ Bob Johnson
SUMMER 1988	Metamusic in the Dental Chair Therapeutic Value of <u>H-PLUS</u> Hemi-Sync and Surgery A Hemi-Sync Experience Some Observations on the Use of the Hemi-Sync Synthesizer	Margaret Paradise Fowler Jones, Ed.D. Christine Horner- Taylor, M.D. Ralph Politte, M.A. W. Philip Irwin
FALL 1988	Neurophysiology Effects & Hemi-Sync Automation Update Healing Tapes Update The New Medicine/Group Mind Update Making Customized Tapes With The Hemi-Sync Synthesizer Tapes For Children Life Transitions Update	F. Holmes Atwater Suzanne Jonas, Ph.D. Teena Anderson Kristen Eichleay Suzanne Morris Ruth Domin
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	Results of Use of Hemi-Sync Tapes and Synthesizer as Support for Personal Counseling and Therapy	Susan Cord
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	Hemi-Sync: Recovering the Attractors Hemi-Sync and the Sleep State A Psychophysiological Study of the Hemi-Sync Process Hemi-Sync Sounds for Synchronizing Brains of Horses Positive Immunity Pilot Program: Hemi-Sync and AIDS Hemi-Sync and Archetype Emergence in Jungian Psychotherapy Hemi-Sync Uses in Military Settings: Education and Counseling	Glenn Pearce F. Holmes Atwater Edgar S. Wilson, M.D. Helene N. Guttman, Ph.D. James R. Greene Laura A. Batchelor, M.A. Raymond O. Waldkoetter, Ph.D.
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WINTER 1996 Vol. XIV No. 1	Oh, the Stories I Could Tell: Hemi-Sync in Family Therapy <i>OPENING THE WAY: A New Hemi-Sync Series</i> to Support Pregnancy and Birth	Debra D. Davis, M.Ed. Janet Henneke, Midwife
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WINTER/ SPRING 2003 Vol. XXI Nos. 1 & 2	A Sympathy with Sounds: Hemi-Sync®, Consciousness, and Cats Preparing to Use Binaural Beat Sound with Deaf Clients	Ronald Russell, MA Helene Guttman, PhD